



PLUMBING TECHNOLOGY

Program of Studies
2015-2016



Office of Career and Technical Education
Kentucky Department of Education



Plumbing Technology

Course Title	Post-Secondary Connection	Valid Course Code	Recommended Grade Level				Recommended Credit
			9	10	11	12	
Basic Plumbing Skills	PLB 151	460513	X	X	X	X	1
Bathroom Install		460514	X	X	X	X	1
Industrial Safety	ISX 100	499930	X	X	X	X	.5
Introduction to Plumbing	PLB 150	460511	X	X	X	X	1
Kitchen Install	PLB 163	460515		X	X	X	1
Plumbing Systems		460512	X	X	X	X	1
Internship (Plumbing)	PLB 298	460521			X	X	1
Co-op (Plumbing)	PLB 299	460518			X	X	1
Special Topics - Plumbing		460599	X	X	X	X	.5 to 1

PLUMBING TECHNOLOGY

Program Description

The Construction Plumbing program will prepare students for work in new construction, remodel, and energy auditing industries. Course offerings include everything from entry level trades courses, kitchen and bathroom installs, plumbing systems, all the way to national certification. Students will train at the career centers, high schools and at real jobsites. Current and traditional plumbing practices are included, while updated and advanced techniques, energy efficiency, health and safety, and sustainability methods are emphasized.

Students will learn the safe and proper use of tools, equipment, and techniques used in the plumbing industry. Formative and summative assessments will be used to determine student proficiency in hand and power tool operation. Instruction will include proper procedures for plumbing residential and commercial projects. Students will complete hands-on projects starting from construction prints to completion.

Course offerings are intended to promote career ladders for those just entering the industry, as well as industry professionals looking to stay current. There are multiple certificates and degree options and inter-related disciplines at the Career Centers having articulation agreements with various post-secondary institutions.

The Construction Plumbing Program prepares students for high-skill, high-wage, and high-demand careers.

SAMPI E- CAREER PATHWAY- Plumbing

KENTUCKY CAREER PATHWAY/PROGRAM OF STUDY 2015-2016

KENTUCKY CAREER PATHWAY/PROGRAM OF STUDY 2015-2016									
COLLEGE/UNIVERSITY:		College / State University			CLUSTER: Construction				
		KCTCS Community College			PATHWAY: Plumbing Assistant				
HIGH SCHOOL (S):		KY ATC/CTC/High School			PROGRAM: Plumbing Technology				
GRADE	ENGLISH	MATH	SCIENCE	SOCIAL STUDIES	REQUIRED COURSES RECOMMENDED ELECTIVE COURSES OTHER ELECTIVE COURSES CAREER AND TECHNICAL EDUCATION COURSES			CREDENTIAL CERTIFICATE DIPLOMA DEGREE	SAMPLE OCCUPATIONS
SECONDARY	9	English I	Algebra I	Earth Space Science	World History	Health and PE	Technical Elective	WPP 200 Workplace Principles	
	10	English II	Geometry	Biology I	World Civics	History and Appreciation of Fine Arts	PLB 150 Introduction to Plumbing 460511 /	PLB 151 Basic Plumbing Skills 460513	
	11	English III	Algebra II	Physics or Chemistry	U.S. History	Foreign Language	PBL 160 Plumbing Systems 460512	PLB 161 Bathroom Install 460514	NCCER Plumbing Level 1 Industrial
	12	English IV	Math Elective	Computer Aided Drafting (elective)	World Geography	PLB 163 Kitchen Install 460515	PLB 198 Internship (Plumbing) 460521	PLB 199 Co-op 1 (Plumbing) 460518	Plumbing Assistant
POSTSECONDARY	Year 13	ENG 101 Writing I	MT 110 Applied Mathematics	ASTR 104 Astronomy	College Chemistry	PSY 100 Intro Psychology	PLB 250 Plumbing Appliances & Fixtures	Occupation & Safety	Plumbing Technician
	Year 14	ENG 200 Intro/Literature	Math 200	WLD 221 Certification Lab	HIS 109 US History	PLB 265 Valve & Faucet Repairs	Materials Science	PLB 298 Plumbing Practicum Repairs & CAD 200	Associates Degree in Applied Science
	Year 15	ENG 200 Intro/Literature	MAT 250 CALCULUS	PHY 236 PHYSICS I	CIV 102 WORLD CIV. II	PHY 195 METHODS OF ENG. PHYSICS	CIV. II	Intermediate Computer Aided design	
	Year 16	PHY 140 INTRO. COMPUTING APPS.	MAT 308 CALCULUS II	PHY 259 STATICS	MAT 309 CALCULUS III	MAT 411 DIFFERENTIALS	TECHNICAL	PHY 330	
	Year 17	PHY 344 FLUID MECHANICS	PHY 370 INTRO. MODERN PHYSICS	CHE 201 GEN. COLLEGE CHEM. I	HUM 211 HUMANITIES	ITD 102 CAD APPLICATIONS	PHY 346 HEAT	PHY 375 MATERIALS SCIENCE	PHY 390 ENGR. MEASUREMENT
	Year 17	PHY 359 MECHANICS OF MATERIALS	PHY 470 OPTICS	PHY 498 SENIOR ENGR. DESIGN I	ECO 231 PRINC. OF MICROECONOMICS	PHY 499 SENIOR ENGR. DESIGN II	TECHNICAL	MAT DEPTH	TECH.ELECTIVE
							BACHELORS DEGREE ENGINEERING	Western Kentucky UNIVERSITY	ENGINEER
Other Elective Courses									
Career and Technical Education Courses									
Credit-Based Transition Programs (e.g. Dual/Concurrent Enrollment, Articulated Courses, 2+2+2)									
(♦=High School to Comm. College) (• =Com. College to 4-Yr Institution) (■ = Opportunity to test out)									
Mandatory Assessments, Advising, and Additional Preparation									
TECHNICAL COLLEGE CREDIT GIVEN THROUGH THE KCTCS DUAL ENROLLMENT PROGRAM									
Certificate given through the Warren County Area Technology Center									
Degree given through the Bowling Green Technical College KCTCS									
DEGREE GIVEN THROUGH THE MURRAY STATE UNIVERSITY									

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**PLUMBING TECHNOLOGY
CAREER PATHWAYS
2015-2016**

**PLUMBER ASSISTANT
CIP 46.0501.02**

PATHWAY DESCRIPTION: A program that prepares individuals to practice as licensed plumbers by applying technical knowledge and skills to lay out, assemble, install, and maintain piping fixtures and systems for steam, natural gas, oil, hot water, heating, cooling, drainage, lubricating, sprinkling, and industrial processing systems in home and business environments. Includes instruction in source determination, water distribution, waste removal, pressure adjustment, basic physics, technical mathematics, blueprint reading, pipe installation, pumps, welding and soldering, plumbing inspection, and applicable codes and standards.

BEST PRACTICE CORE

**EXAMPLE
ILP-RELATED
CAREER TITLES**

*Foundational Skills Necessary for Career-Ready Measure:
(KOSSA/Industry Certification)*

*Complete (2) **TWO CREDITS**:*

- 460511 Introduction to Plumbing
- 460513 Basic Plumbing Skills

*Choose (2) **TWO CREDITS** from the following:*

- 460512 Plumbing Systems
- 460514 Bathroom Install
- 460515 Kitchen Install
- 460518 Co-op (Plumbing) OR
460521 Internship (Plumbing)

Construction Laborer
Construction Manager
Construction
Tradesperson
Plumber
Pipefitter

COMPLIMENTARY OR ADVANCED COURSEWORK BEYOND PLUMBING TECHNOLOGY CAREER PATHWAY(S)	
Upon completion of a pathway, additional coursework to enhance student learning is encouraged.	
Credits earned in Advanced or Complimentary Coursework “Beyond the Pathway” may not be substituted for pathway courses in order to achieve Preparatory or Completer status.	
<ul style="list-style-type: none"> • 460599 Special Topics - Plumbing 	
<ul style="list-style-type: none"> • 499930 Industrial Safety (.5 credit) 	
<ul style="list-style-type: none"> • Career Options 	
<ul style="list-style-type: none"> • JAG Courses 	

Basic Plumbing Skills

460513

Course Description

This course introduces the student to basic pipe joining techniques.

Content/Process

1

Basic Plumbing Skills:

- a) Make a measurement with a rule
- b) Measure, cut, ream, and thread steel pipe using hand tools
- c) Measure, cut, and ream steel pipe using power equipment
- d) Join steel pipe and fitting
- e) Cut cast iron using a hammer and chisel and other tools
- f) Cut cast-iron pipe using snap chain cutter or wheel cutter
- g) Join cast-iron pipe and fittings using lead and oakum
- h) Join cast-iron pipe and fittings using a compressed gasket
- i) Join cast-iron pipe using no-hub clamp
- j) Measure and cut copper pipe, using hacksaw and tubing cutters, and ream
- k) Join copper pipe and fittings using soldering method
- l) Join copper pipe and fittings using flare method
- m) Join copper pipe and fittings using compression method

Connections:

*Common Core State Standards

*KOSSA

*Common Core Technical Standards

*New Generation Science Standards

*Post-Secondary: KCTCS PLB 151

CTSO's – Skills USA

Bathroom Install

460514

Course Description

This course will develop the skills necessary to rough-in and install a bathroom group and auxiliary fixtures for residential or commercial applications.

Content/Process

1

Bathroom Install:

- a) Rough in waste and vent pipes for built-in lavatories
- b) Rough in the water supply for lavatory
- c) Install a lavatory
- d) Rough in waste and vent pipes for floor mount water closet
- e) Rough in the water supply for water closet
- f) Install a water closet
- g) Rough in waste and vent pipes for bathtub
- h) Rough in the water supply for bathtub
- i) Install a bathtub
- j) Install urinal and bidet
- k) Rough in waste and vent pipes for shower bath
- l) Rough in the water supply for shower
- m) Install shower bath

Connections:

*Common Core State Standards

*KOSSA

*Common Core Technical Standards

*New Generation Science Standards

CTSO's – Skills USA

Industrial Safety

499930

Course Description

This course provides practical training in industrial safety. The students are taught to observe general safety rules and regulations, to apply work site and shop safety rules, and to apply OSHA regulations. Students are expected to obtain certification in first aid and cardiopulmonary resuscitation.

Content/Process

1

Industrial Safety:

- a) Apply work site and lab safety procedures
- b) Apply personal safety rules and procedures
- c) Apply fire prevention rules and procedures
- d) Obtain first aid certification
- e) Obtain CPR certification (Recommended but not required)
- f) Demonstrate hazardous communications procedures
- g) Describe and demonstrate universal precautions procedures
- h) Obtain OSHA 10 certification (recommended but not required)

Connections:

*Common Core State Standards

*KOSSA

*Common Core Technical Standards

*New Generation Science Standards

*Post-Secondary: KCTCS ISX 100

CTSO's – Skills USA

Introduction to Plumbing

460511

Course Description

This course introduces the origin and basic principles of the plumbing industry. Also included is the orientation of methods associated with the plumbing industry.

Content/Process

1

Introduction to Plumbing:

- a) Read a ruler
- b) Work with hand tools
- c) Work with power tools
- d) Work with steel pipe, tools, and methods
- e) Learn cast iron pipe methods of cutting
- f) Learn methods of joining cast iron pipe
- g) Work with copper tubing
- h) Learn methods of joining copper pipe
- i) Work with PVC and ABS plastics
- j) Work with PVC and CPVC water pipe
- k) Learn methods of joining different pipe materials
- l) Learn methods of pipe support
- m) Apply for a job
- n) Join copper pipe and fittings using the flaring method
- o) Join copper pipe and fittings using the compression method
- p) Bend copper pipe using spring benders
- q) Cut plastic pipe
- r) Join plastic pipe using the solvent weld and thermo welding methods
- s) Join plastic pipe using insert and threaded fittings
- t) Join pipes of different types
- u) Cut woodwork for drain, waste, and vent pipes
- v) Install fixture supports
- w) Inventory plumbing fixtures and supplies
- x) Secure pipes to wood structures
- y) Secure pipes to concrete structures
- z) Secure pipes to metal structures
- aa) Install water hammer arrestors
- bb) Install wall hydrants
- cc) Install yard hydrants
- dd) Thaw frozen water pipes
- ee) Insulate water pipes
- ff) Apply for a plumbing-related job

Connections:

*Common Core State Standards

*KOSSA

*Common Core Technical Standards

*New Generation Science Standards

*Post-Secondary: KCTCS PLB150

CTSO's – Skills USA

Kitchen Install

460515

Course Description

This course will develop the skills necessary to rough in and install a kitchen group and laundry fixtures for residential and commercial applications.

Prerequisite: Basic Plumbing Skills

Content/Process

Kitchen Install:

- a) Rough in waste and vent pipes for kitchen sink
- b) Rough in the water supply for kitchen sink
- c) Install a kitchen sink
- d) Install garbage disposal unit
- e) Install dishwasher opening
- f) Rough in waste and vent pipes for automatic washer
- g) Rough in the water supply for automatic washer

Connections:

*Common Core State Standards

*KOSSA

*Common Core Technical Standards

*New Generation Science Standards

*Post-Secondary: KCTCS PLB 163

CTSO's – Skills USA

Plumbing Systems

460512

Course Description

This course presents a study of designing and sizing water distribution and drain, waste, and vent pipes, in addition to studies of code requirements and installation of common residential fixtures.

Prerequisite: PLB 150

Content/Process

1

Plumbing Systems:

- a) Identify drain, waste, and vent
- b) Learn code sizing of DWV
- c) Size a bathroom group
- d) Identify water distribution
- e) Learn the sizes of the water lines for a bathroom group
- f) Learn how to set a water closet
- g) Learn how to set a lavatory
- h) Learn how to install a bathtub
- i) Learn how to install a shower
- j) Learn the sizing of the kitchen and laundry
- k) Learn how to install a kitchen sink unit
- l) Identify auto-washer openings
- m) Learn cross-connections
- n) Install other plumbing fixtures

Connections:

*Common Core State Standards

*KOSSA

*Common Core Technical Standards

*New Generation Science Standards

CTSO's – Skills USA

Internship (Plumbing)

460521

Course Description		
The Practicum provides supervised on-the-job work experience related to the student's educational objectives. Students participating in the Practicum do not receive compensation.		
Content/Process		
1	Internship (Plumbing): <ol style="list-style-type: none"> a) Gain career awareness and the opportunity to test career choice(s) b) Receive work experience related to career interests prior to graduation c) Integrate classroom studies with work experience d) Receive exposure to facilities and equipment unavailable in a classroom setting e) Increase employability potential after graduation 	
Connections: *Common Core State Standards *KOSSA *Common Core Technical Standards *New Generation Science Standards *Post-Secondary: KCTCS PLB 298 CTSO's – Skills USA		

Co-op (Plumbing)

460518

Course Description

Cooperative Education provides supervised on-the-job work experience related to the student's educational objectives. Students participating in the Cooperative Education program receive compensation for their work.

Content/Process

Co-op (Plumbing):

- a) Gain career awareness and the opportunity to test career choice(s)
- b) Receive work experience related to career interests prior to graduation
- c) Integrate classroom studies with work experience
- d) Receive exposure to facilities and equipment unavailable in a classroom setting
- e) Increase employability potential after graduation
- f) Earn funds to help finance education expenses

Connections

*Secretary's Commission on Achieving Necessary Skills (SCANS)

*National Center for Construction Education Research (NCCER)

*21st Century Skills

*Common Core State Standards ELA and Math

*Post-Secondary: KCTCS PLB 299

*Interdisciplinary Course

Special Topics - Plumbing

460521

Course Description		
Instruction related to Plumbing Technology but not described in the above courses.		
Content/Process		
1	Special Topics - Plumbing a) Selected tasks/problems as determined by the instructor	
<p>Connections:</p> <ul style="list-style-type: none">*Common Core State Standards*KOSSA*Common Core Technical Standards*New Generation Science Standards*Post-Secondary: KCTCS PLB 298CTSO's – Skills USA		